

## CLAIMS

1           1.       (previously presented) A method for reducing spurious emissions in an amplified signal  
2 by applying pre-distortion, whose magnitude is frequency-dependent, to an input signal to generate a pre-  
3 distorted signal, such that, when the pre-distorted signal is applied to an amplifier to generate the  
4 amplified signal, the pre-distortion reduces spurious emissions in the amplified signal, wherein the pre-  
5 distorted signal is generated by:

6           (a)       generating a first frequency-dependent pre-distortion signal corresponding to a first set of  
7 frequency components for the input signal;

8           (b)       generating a second frequency-dependent pre-distortion signal corresponding to a second  
9 set of frequency components for the input signal, wherein the first set of frequency components is  
10 different from the second set of frequency components; and

11          (c)       combining the first and second frequency-dependent pre-distortion signals to generate  
12 the pre-distorted signal, wherein:

13               the first set of frequency components corresponds to positive frequency components of  
14 the input signal; and

15               the second set of frequency components corresponds to negative frequency components  
16 of the input signal.

1           2.       (previously presented) The method of claim 1, wherein the phase of the pre-distortion is  
2 also frequency-dependent.

1           3.       (canceled)

1           4.       (previously presented) The method of claim 1, wherein:  
2 the first frequency-dependent pre-distortion signal is generated by:

3           (1)       generating a first set of one or more waveforms corresponding to a first set of  
4 one or more pre-distortion parameters;

5           (2)       differentiating the first set of one or more waveforms with respect to time to  
6 generate a first set of one or more differentiated waveforms; and

7           (3)       applying the first set of one or more differentiated waveforms to a positive-  
8 frequency operation to generate the first frequency-dependent pre-distortion signal; and

9               the second frequency-dependent pre-distortion signal is generated by:

10          (1)       generating a second set of one or more waveforms corresponding to a second set  
11 of one or more pre-distortion parameters;

12          (2)       differentiating the second set of one or more waveforms with respect to time to  
13 generate a second set of one or more differentiated waveforms; and

14          (3)       applying the second set of one or more differentiated waveforms to a negative-  
15 frequency operation to generate the second frequency-dependent pre-distortion signal.

1           5-6.     (canceled)

1           7.       (previously presented) The method of claim 1, further comprising the step of generating  
2 a frequency-independent pre-distorted signal from the input signal, wherein the frequency-independent  
3 pre-distorted signal and the first and second frequency-dependent pre-distortion signals are combined to  
4 generate the pre-distorted signal.

1           8.       (previously presented) The method of claim 1, wherein:  
2 the input signal is represented in a base-band domain; and  
3 the first and second frequency-dependent pre-distortion signals are generated in a digital domain.

1           9.       (original) An apparatus for applying pre-distortion to an input signal to generate a pre-  
2 distorted signal, such that, when the pre-distorted signal is applied to an amplifier to generate an  
3 amplified signal, the pre-distortion reduces spurious emissions in the amplified signal, the apparatus  
4 comprising:  
5           (a)       a first signal processing path adapted to generate a main pre-distortion signal from the  
6 input signal;  
7           (b)       a second signal processing path adapted to generate a first frequency-dependent pre-  
8 distortion signal corresponding to a first set of frequency components for the input signal;  
9           (c)       a third signal processing path adapted to generate a second frequency-dependent pre-  
10 distortion signal corresponding to a second set of frequency components for the input signal, wherein the  
11 first set of frequency components is different from the second set of frequency components; and  
12           (d)       a combiner adapted to combine the first and second frequency-dependent pre-distortion  
13 signals with the main pre-distortion signal to generate the pre-distorted signal.

1           10.       (previously presented) The apparatus of claim 9, wherein:  
2 the first set of frequency components corresponds to positive frequency components of the input  
3 signal; and  
4 the second set of frequency components corresponds to negative frequency components of the  
5 input signal.

1           11.       (previously presented) The apparatus of claim 10, wherein:  
2 the first frequency-dependent pre-distortion signal is generated by:  
3           (1)       generating a first set of one or more waveforms corresponding to a first set of  
4 one or more pre-distortion parameters;  
5           (2)       differentiating the first set of one or more waveforms with respect to time to  
6 generate a first set of one or more differentiated waveforms; and  
7           (3)       applying the first set of one or more differentiated waveforms to a positive-  
8 frequency operation to generate the first frequency-dependent pre-distortion signal; and  
9 the second frequency-dependent pre-distortion signal is generated by:  
10           (1)       generating a second set of one or more waveforms corresponding to a second set  
11 of one or more pre-distortion parameters;  
12           (2)       differentiating the second set of one or more waveforms with respect to time to  
13 generate a second set of one or more differentiated waveforms; and  
14           (3)       applying the second set of one or more differentiated waveforms to a negative-  
15 frequency operation to generate the second frequency-dependent pre-distortion signal.

1           12.       (currently amended) The apparatus of claim 11, wherein the positive-frequency and  
2 negative-frequency operations are implemented using filters.

1           13.       (previously presented) The apparatus of claim 9, wherein:  
2 the first set of frequency components corresponds to positive and negative frequency components  
3 of the input signal; and  
4 the second set of frequency components corresponds to only positive frequency components or  
5 only negative frequency components of the input signal.

1           14.       (previously presented) The apparatus of claim 13, wherein:  
2 the first frequency-dependent pre-distortion signal is generated by:  
3           (1)       generating a first set of one or more waveforms corresponding to a first set of  
4 one or more pre-distortion parameters;

5                   (2)     differentiating the first set of one or more waveforms with respect to time to  
6 generate the first frequency-dependent pre-distortion signal; and  
7                   the second frequency-dependent pre-distortion signal is generated by:  
8                   (1)     generating a second set of one or more waveforms corresponding to a second set  
9 of one or more pre-distortion parameters;  
10                  (2)     differentiating the second set of one or more waveforms with respect to time to  
11 generate a second set of one or more differentiated waveforms; and  
12                  (3)     applying the second set of one or more differentiated waveforms to a negative-  
13 frequency operation or a positive-frequency operation to generate the second frequency-dependent pre-  
14 distortion signal.

1                   15.     (previously presented) The apparatus of claim 14, wherein the positive-frequency  
2 operation or the negative-frequency operation is implemented using a filter.

1                   16.     (previously presented) The apparatus of claim 9, wherein:  
2 the input signal is represented in a base-band domain; and  
3 the main pre-distortion signal and the first and second frequency-dependent pre-distortion signals  
4 are generated in a digital domain.

1                   17.     (previously presented) The apparatus of claim 9, wherein:  
2 the first signal processing path comprises:  
3                   (1)     an index generator adapted to generate index values proportional to envelope  
4 power of the input signal;  
5                   (2)     a first look-up table adapted to provide first and second pre-distortion parameters  
6 using the index values; and  
7                   (3)     a first multiplier adapted to multiply the input signal by the first and second pre-  
8 distortion parameters to generate the main pre-distortion signal;  
9                   the second signal processing path comprises:  
10                  (1)     a second look-up table adapted to provide third and fourth pre-distortion  
11 parameters using the index values;  
12                  (2)     a second multiplier adapted to multiply the input signal by the third and fourth  
13 pre-distortion parameters to generate first multiplied signals; and  
14                  (3)     a first differentiator adapted to differentiate the first multiplied signals with  
15 respect to time to generate first differentiated signals; and  
16                   the third signal processing path comprises:  
17                  (1)     a third look-up table adapted to provide fifth and sixth pre-distortion parameters  
18 using the index values;  
19                  (2)     a third multiplier adapted to multiply the input signal by the fifth and sixth pre-  
20 distortion parameters to generate second multiplied signals; and  
21                  (3)     a second differentiator adapted to differentiate the second multiplied signals with  
22 respect to time to generate second differentiated signals.

1                   18.     (previously presented) The apparatus of claim 17, wherein:  
2 the second signal processing path further comprises a positive-frequency filter adapted to filter  
3 the first differentiated signals to generate the first frequency-dependent predistortion signal; and  
4 the third signal processing path further comprises a negative-frequency filter adapted to filter the  
5 second differentiated signals to generate the second frequency-dependent predistortion signal.

1                   19.     (previously presented) The apparatus of claim 17, wherein:  
2 the first differentiated signals are the first frequency-dependent predistortion signal; and

3 the third signal processing path further comprises either a positive-frequency filter or a negative-  
4 frequency filter adapted to filter the second differentiated signals to generate the second frequency-  
5 dependent predistortion signal.

1 20. (previously presented) A method for reducing spurious emissions in an amplified signal  
2 by applying pre-distortion, whose magnitude is frequency-dependent, to an input signal to generate a pre-  
3 distorted signal, such that, when the pre-distorted signal is applied to an amplifier to generate the  
4 amplified signal, the pre-distortion reduces spurious emissions in the amplified signal, wherein the pre-  
5 distorted signal is generated by:

6 (a) generating a first frequency-dependent pre-distortion signal corresponding to a first set of  
7 frequency components for the input signal;

8 (b) generating a second frequency-dependent pre-distortion signal corresponding to a second  
9 set of frequency components for the input signal, wherein the first set of frequency components is  
10 different from the second set of frequency components; and

11 (c) combining the first and second frequency-dependent pre-distortion signals to generate  
12 the pre-distorted signal, wherein:

13 the first set of frequency components corresponds to positive and negative frequency  
14 components of the input signal; and

15 the second set of frequency components corresponds to only positive frequency  
16 components or only negative frequency components of the input signal.

1 21. (previously presented) The method of claim 20, wherein the phase of the pre-distortion  
2 is also frequency-dependent.

1 22. (previously presented) The method of claim 20, wherein:  
2 the first frequency-dependent pre-distortion signal is generated by:

3 (1) generating a first set of one or more waveforms corresponding to a first set of  
4 one or more pre-distortion parameters;

5 (2) differentiating the first set of one or more waveforms with respect to time to  
6 generate the first frequency-dependent pre-distortion signal; and

7 the second frequency-dependent pre-distortion signal is generated by:

8 (1) generating a second set of one or more waveforms corresponding to a second set  
9 of one or more pre-distortion parameters;

10 (2) differentiating the second set of one or more waveforms with respect to time to  
11 generate a second set of one or more differentiated waveforms; and

12 (3) applying the second set of one or more differentiated waveforms to a negative-  
13 frequency operation or a positive-frequency operation to generate the second frequency-dependent pre-  
14 distortion signal.

1 23. (previously presented) The method of claim 20, further comprising the step of  
2 generating a frequency-independent pre-distorted signal from the input signal, wherein the frequency-  
3 independent pre-distorted signal and the first and second frequency-dependent pre-distortion signals are  
4 combined to generate the pre-distorted signal.

1 24. (previously presented) The method of claim 20, wherein:  
2 the input signal is represented in a base-band domain; and  
3 the first and second frequency-dependent pre-distortion signals are generated in a digital domain.